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ABSTRACT

This brief discusses how faculty can use principles of universal design to maximize the learning of all college students, including students with disabilities. Principles of universal design are first explained, including: equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error, low physical effort, and size and space for approach and use. The brief then lists examples of instructional methods that employ principles of universal design and make course content and activities accessible to people with a wide range of abilities: (1) inclusiveness, which creates a classroom environment that respects and values diversity; (2) physical access, which assures that classrooms, labs, and field work are accessible to individuals with a wide range of physical abilities and disabilities; (3) delivery methods and alternate delivery methods, which includes lecture, discussion, hands-on activities, Internet-based interaction, and field work; (4) information access, which uses captioned videotapes; (5) interaction, which encourages different ways for students to interact with each other and faculty; (6) feedback, which provides effective prompting during an activity and feedback after the assignment is complete; and (7) demonstration of knowledge, which provides multiple ways for students to demonstrate knowledge. A list of 17 resources on universal design is provided. (CR)

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Universal Design of Instruction

Sheryl Burgstahler

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Universal Design of Instruction

DO-IT

By Sheryl Burgstahler, Ph.D.

Precollege and college students come from a wide variety of ethnic and racial backgrounds. For some, English is not their first language. Represented in most classes are many types of learning styles, including visual or auditory learners. In addition, increasing numbers of students with disabilities are included in regular precollege and postsecondary education courses. Their disabilities include blindness, low vision, hearing impairments, mobility impairments, learning disabilities, and health impairments.

Students want to learn and instructors share this goal. How can you design instruction to maximize the learning of all students? The field of universal design can provide a starting point for developing an inclusive model for instruction. You can apply this body of knowledge to create courses where lectures, discussions, visual aids, videotapes, printed materials, labs, and fieldwork are accessible to all students.

Universal Design

Designing any product or service involves the consideration of many factors, including aesthetics, engineering options, environmental issues, safety concerns, and cost. Typically, products are to be designed to be most suitable for the average user. In contrast, universal design is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design (*http://www.design.ncsu.edu/cud/univ_design/ud.html*). For example, a standard door in a place of business is not accessible to everyone. If a large switch is installed, the door becomes accessible to more people, including some wheelchair users. However, applying universal design principles when a business facility is being designed could lead to the installations of sensors that would signal the door to open when anyone approaches it, making the building accessible to everyone – a small child, a man whose arms are temporarily unavailable because he is carrying a large box, a frail elderly woman, a person using a walker or a wheelchair. When designers apply universal design principles, their products and services meet the needs of potential users with a wide variety of characteristics. Disability is just one of many characteristics that an individual might possess. For example, one person could be five feet four inches tall, female, forty years old, a poor reader, and deaf. All of these characteristics, including her deafness, should be considered when developing a product or service she might use.

Making a product accessible to people with disabilities often benefits others. For example, sidewalk curb cuts, designed to make sidewalks and streets accessible to those using wheelchairs, are today often used by kids on skateboards, parents with baby strollers, and delivery staff with rolling carts. When television displays in noisy areas of airports and restaurants are captioned, they are more accessible to people who are deaf and everyone else.

At the Center for Universal Design at North Carolina State University a group of architects, product designers, engineers, and environmental design researchers established the following set of principles of universal design to provide guidance in the design of environments, communications, and products (Connell, Jones, Mace, Mueller, Mullick, Ostroff, Sanford, Steinfeld, Story, & Vanderheiden, 1997). They can be applied to academic environments, communications, and products.

1. **Equitable Use**. The design is useful and marketable to people with diverse abilities. *For example, a Web site that is designed so that it is accessible to everyone, including people who are blind, employs this principle.*

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2. **Flexibility in Use**. The design accommodates a wide range of individual preferences and abilities. *An example is a museum that allows a visitor to choose to read or listen to the description of the contents of a display case.*

3. **Simple and Intuitive Use**. Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level. *Science lab equipment with control buttons that are clear and intuitive is a good example of an application of this principle.*

4. **Perceptible Information**. The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities. *An example of this principle being employed is when television programming projected in noisy public areas like academic conference exhibits include captions.*

5. **Tolerance for Error**. The design minimizes hazards and the adverse consequences of accidental or unintended actions. *An example of a product applying this principle is an educational software program that provides guidance when the user makes an inappropriate selection.*

6. **Low Physical Effort**. The design can be used efficiently and comfortably, and with a minimum of fatigue. *Doors that are easy to open by people with a wide variety of physical characteristics demonstrate the application of this principle.*

7. **Size and Space for Approach and Use**. Appropriate size and space is provided for approach, reach, manipulation, and use regardless of the user's body size, posture, or mobility. *A flexible science lab work area designed for use by students with a wide variety of physical characteristics and abilities is an example of employing this principle.*

Universal Design of Instruction

Universal design principles can be applied to many products and services. Following is a definition of universal design of instruction:

> In terms of learning, universal design means the design of instructional materials and activities that makes the learning goals achievable by individuals with wide differences in their abilities to see, hear, speak, move, read, write, understand English, attend, organize, engage, and remember. Universal design for learning is achieved by means of flexible curricular materials and activities that provide alternatives for students with differing abilities. These alternatives are built into the instructional design and operating systems of educational materials-they are not added on after-the-fact. (Council for Exceptional Children p. 2)

Universal design principles can apply to lectures, classroom discussions, group work, handouts, Web-based instruction, labs, field work, and other academic activities and materials. They give each student meaningful access to the curriculum by assuring access to the environment as well as multiple means of representation, expression, and engagement *(http://www.cast.org/)*. Listed below are examples of instructional methods that employ principles of universal design. They make course content and activities accessible to people with a wide range of abilities, disabilities, ethnic backgrounds, language skills, and learning styles.

1. **Inclusiveness**. Create a classroom environment that respects and values diversity. Put a statement on your syllabus inviting students to meet with you to discuss disability-related accommodations and other special learning needs. Avoid segregating or stigmatizing any student. Respect the privacy of all students.

2. **Physical Access**. Assure that classrooms, labs, and field work are accessible to individuals with a wide range of physical abilities and disabilities. Make sure equipment and activities minimize sustained physical effort, provide options for operation, and accommodate right- and left-handed students as well as those with limited physical abilities. Assure the safety of all students.

3. **Delivery Methods**. Alternate delivery methods, including lecture, discussion, hands-on activities, Internet-based interaction, and field work. Make sure each is accessible to students with a wide range of abilities, disabilities, interests, and previous experiences. Face the class and speak clearly in an environment that is comfortable and free from distractions. Use multiple modes to deliver content. Provide printed materials that summarize content that is delivered orally.

4. **Information Access**. Use captioned videotapes. Make printed materials available in electronic format. Provide text descriptions of graphics presented on Web pages. Provide printed materials early to allow students to prepare for the topic to be presented. Create printed and Web-based materials in simple, intuitive, and consistent formats. Arrange content in order of importance.

5. **Interaction**. Encourage different ways for students to interact with each other and with you. These methods may include in-class questions and discussion, group work, and Internet-based communications. Strive to make them accessible to everyone, without accommodation.

6. **Feedback**. Provide effective prompting during an activity and feedback after the assignment is complete.

7. **Demonstration of Knowledge**. Provide multiple ways for students to demonstrate knowledge. For example, besides traditional tests and papers, consider group work, demonstrations, portfolios, and presentations as options for demonstrating knowledge.

Employing universal design principles in instruction does not eliminate the need for specific accommodations for students with disabilities. For example, you may need to provide a sign language interpreter for a student who is deaf. However, applying universal design concepts in course planning will assure full access to the content for most students and minimize the need for special accommodations. For example, designing Web resources in accessible format as they are developed means that no redevelopment is necessary if a blind student enrolls in the class. Letting all students have access to your class notes and assignments on an accessible Web site can eliminate the need for providing material in alternative formats. Planning ahead saves time in the long run.

Universal design can also generate unanticipated benefits for others. For example, captioning course videotapes, which provides access to deaf students, is also a benefit to students for whom English is a second language, to some students with learning disabilities, and to those watching the tape in a noisy environment. Delivering content in redundant ways can improve instruction for everyone, including students with a variety of learning styles and central backgrounds. Employing universal design principles in everything we do makes a more accessible world for all of us. It minimizes the need to alter it for anyone.

Resources

If you work at a postsecondary institution, the office that provides support for students with disabilities may be of assistance in designing an accessible course. Human resources offices of large companies and agencies may also provide assistance. Explore regional and state resources as well. You may also find the following resources useful.

American with Disabilities Act of 1990, 104 STAT.327. Available at *http://www.usdoj.gov/crt/ada/statute.html*

Bar, L., & Galluzzo, J. (1999). The accessible school: Universal design for educational settings. Berkeley, CA: MIG Communications.

Bowe, F.G. (2000). Universal design in education. Westport, CT: Bergin & Garvey.

Center for Applied Special Technology (CAST) *http://www.cast.org/udl/*

The Center for Universal Design
http://www.design.ncsu.edu/cud/

Connell, B.R., Jones, M., Mace, R., Mueller, J., Mullick, A., Ostroff, E., Sanford, J., Steinfeld, E., Story, M., & Vanderheiden, G. (1997). The principles of universal design. Raleigh, NC: North Carolina State University, Center for Universal Design. Available at *http://www.design.ncsu.edu/cud/univ_design/princ_overview.htm*

Council for Exceptional Children
http://www.cec.sped.org/osep/udesign.html

DO-IT
http://www.washington.edu/doit/

IDEA Center
http://www.ap.buffalo.edu/~idea/BrightIDEA/

The Lighthouse
http://www.lighthouse.org/

National Center for Accessible Media (NCAM)
http://main.wgbh.org/wgbh/pages/ncam/

National Center on Dissemination of Disability Research
http://www.ncddr.org/rpp/emp/empdw/index.html

Recordings for the Blind and Dyslexic
http://www.rfbd.org/

Trace Research and Development Center
http://www.trace.wisc.edu/world/

Vanderheiden, G.C. (1990). Thirty-something million: Should they be exceptions? Human Factors, 32(4), 383-396.
http://www.trace.wisc.edu/docs/30_some/30_some.htm

Web Accessibility Initiative, World Wide Web Consortium
http://www.w3.org/WAI/

WebABLE
http://www.webable.com/

Grants and gifts fund DO-IT publications, videotapes, and programs to support the academic and career success of people with disabilities. Contribute today by sending a check to DO-IT, Box 355670, University of Washington, Seattle, WA 98195-5670.

Your gift is tax deductible as specified in IRS regulations. Pursuant to RCW 19.09, the University of Washington is registered as a charitable organization with the Secretary of State, State of Washington. For more information, call the Office of the Secretary of State, 1-800-322-4483.

About DO-IT

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